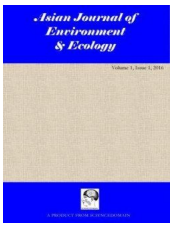

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# A Study of Cyclists Activity Involvement, Place Attachment, Satisfaction and Loyalty

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***Authors' contributions***

*This work was carried out in collaboration between both authors. Author CLC designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author HMC managed the analyses of the study. Both authors read and approved the final manuscript.*

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## ABSTRACT

The purpose of this study is to analyze cyclist's activity involvement, place attachment and satisfaction, how to affect their loyalty for bikeway. A total of 451 respondents completed a survey conducted on Tanyashen Greenway Bikeway at Taichung City, Taiwan. Using structural equation modeling, the results as follows: (1) the activity involvement had a significant and positive influence on place attachment, satisfaction, and loyalty; (2) cyclists' place attachment of bikeway had a significant and positive influence on satisfaction, and loyalty; (3) satisfaction had a significant and positive effect on loyalty. The empirical results indicate that the active involvement leads to a greater perception of place attachment and satisfaction and fosters the loyalty of cyclists. Managerial implications with regard to cycling are drawn based on the research findings, and suggestions for future researchers are presented.

*Keywords: Cyclist; activity involvement; place attachment; satisfaction; loyalty.*

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## 1. INTRODUCTION

Taiwan is the name of the bicycle kingdom, and in recent years the promotion of leisure culture and environmental protection policies by government sectors have made bicycle recreational activity popular in Taiwan. The reason for cycling prevailing, the most important factor is the promotion of the government, and the use of countryside path or embankment to planning bikeway. These bikeways have their own unique planning features. Special bikeways are built along the traditional farmhouses and towns, the seaport and the old railroads. During the holidays, many people are attracted to come and engage in activities to form a new trend of tourism. Therefore, it is of great importance to maintain a sustainable bikeway and maintain the loyalty to the people to use it continuously. The concept of activity involved in the 1980s has been widely used in the field of research on tourism and leisure [1,2], and in the field of leisure activity involvement also refers to a kind of an activity or related products that cannot be explained by motivation, arousal and importance, the specific situation and the incentive behavior is thus arising out of the performance [1]. From the perspective of leisure and recreation activities, the field of human and environment is not separable. The relationship between individuals and environmental fields is also called "sense of place". Such connection and dependence make the environment field meaningful for individuals [3]. Due to the participation of individuals have functional needs of the place, they will develop place dependence. While individuals have special feelings for places, they will develop their place identity [4,5]. Want to people willing to involve in leisure activities, use facilities satisfaction have important influence, that "satisfaction" has been the research tool used to measure people of products, work, quality of life, community or outdoor recreation etc. [6,7], and research found that satisfaction will affect loyalty [8]. Based on the above description, the bikeway is a part of local leisure and recreation facilities, these cyclists involved activities on the environment and the feeling of cycling, will affect the reputation for bikeway and revisiting willingness to use. So, the main purpose of this study is to the analysis of cyclist's activity involvement, place attachment and satisfaction, how to affect cyclists use the bikeway loyalty, hope the results of the analysis can provide reference to the government sectors.

## 2. LITERATURE REVIEW

The concept of involvement was first applied to the consumer behavior field of measure, second is used to leisure and recreation research field. That the application of the concept of understanding the involvement, as the research field of leisure and recreation for reopening a new level. Study on the concept of involvement in the field of leisure and recreation is mainly by itself bringing meaning or relation to participants, participate in behavior understanding, and brought to participate in leisure activities or sense of emotional attachment [9]. Relate research indicates that place attachment is a result of user's experience of special emotion and memory to the environment and the perceptual reaction to emotion and evaluation with the real environment of the place [10,11]. In other words, when the individual of a recreational site's links or participation is very strong, it will be on the premises of the place in the location of the activity is easy to produce a positive emotional connection, the recreational involvement and place attachment relationship between the association is also speculation [3,4]. In the empirical research literature on related recreational activities and place attachment, it is found that involvement does affect the place attachment [4,11,12,13]. However, there are many aspects of the involvement, and related studies have pointed out that involvement will affect the life satisfaction of the participants [14]. Gahwiler and Havitz (1998) explored the relationship between leisure social interaction group, leisure involvement, psychological commitment and behavioral loyalty, and found that leisure involvement can affect the behavioral loyalty to recreational travelers [15]. Iwasaki and Havitz (2004) verified the relationship between leisure involvement, psychological commitment and behavioral loyalty, it also found that there was a positive relationship between leisure involvement and behavioral loyalty [16]. Based on the above analysis, this study proposes the following first to third hypotheses:

H1: Cyclists for their activities involvement have positive effect on place attachment.
H2: Cyclists for their activities involvement have positive effect on satisfaction.
H3: Cyclists for their activities involvement have positive effect on loyalty.

Place attachment is people's positive feelings about the activity environment. Williams, Patterson, Roggenbuck and Waston (1992) think

that place attachment is the environmental user's feelings for the environment, and the symbolic meaning given by the environment [11]. Bricker and Kerstetter (2000) pointed out that the place attachment is a kind of emotional support, the degree of integration of environmental consciousness and the user places [3]. Review the research on-site attachment to environmental psychology, it is mainly divided into two parts: place dependence and place identity. In previous literature, the relationship between place dependence and place identity is also demonstrated [5,11]. The past research on satisfaction and place attachment result shows that they have a significant positive relationship [17], and that the antecedents of satisfaction with local attachment [18,19,20,21]. Some research results indicate that tourists are satisfied with the tourism environment and participate in activities, will affect the individual tourist destinations of emotion or function as the attachment behavior [4,17], more enhanced local identity and a sense of dependence, and social connection and emotional attachment [17]. Tourist satisfaction is an important indicator of the quality of the tourist destination, and the satisfaction with tourists will affect their loyalty to the destination [22,23]. Hepworth and Mateus (1994) point out that consumers are willing to buy again or recommend the product to others and make a positive word of mouth known as "loyalty" [24]. Zeithaml, Berry and Parasuraman (1996) research show that customers who are loyal will recommend products to others, inform others about products positive meaning, encourage their friends and relatives to consume, and will also purchase in the future [25]. In the study of tourism consumptive behavior, it is also found that satisfaction has a positive effect on loyalty [26]. Based on the above analysis, this study proposes the following fourth to six hypotheses:

H4: Cyclists for their place attachment have positive effect on satisfaction.
H5: Cyclists for their place attachment have positive effect on loyalty.
H6: Cyclists for their satisfaction have positive effect on loyalty.

## 3. METHODS

### 3.1 Research Area

The Tanyashen greenway bikeway located at Tanzi district, Taichung City, Taiwan, this lane used to pass railway to constructed, this section from Sangan branches railway reconstruction of bikeway is about 12 kilometers, through three District in Taichung City.

### 3.2 Subject and Sampling

The subject of this sample was to study the cyclists who age over and 18 in the Yatasan bikeway at Taichung City, Taiwan (see Figs. 1-3). The researchers conducted questionnaires at the end of the bikeway, use convenience sampling method, from Dec 2016 to Jan 2017. On weekdays there are not many people cycling, almost is local people, average about 50 people. On the holidays, only just visitors from other place come to cycling, average about 200-300 people. Because researchers can't confirm the number of people that actually engage in activities and avoid repeated sampling problems. After the researchers observed on site, found survey the rate of the invalid questionnaire may be very high, because there are notable and seat on cyclist rest, therefore, decided to take 500 samples. A total of 500 copies were issued with this study, and 451 valid questionnaires were collected. The effective questionnaire rate was 90.2%.

**Figs. 1.2.3. Tanyashen greenway bikeway [27]**

### 3.3 Questionnaire

The questionnaire of this study is divided into five parts. The first part is the Involvement Scale, a total of 3 questions, is mainly understand the rider that bikeway for their importance, such as give self the gift and can express selves. The questionnaire mainly refers to the relevant research of tourist involvement [1,28]. The respondents noted their agreement with each item using a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The second part is the Place Attachment Scale, which is mainly to understand cyclists' feelings about the quality and quantity of Penghu Island tourism services. There are 11 questions, is mainly understand the rider bikeway for their place dependence, identity, and preference. This section mainly refers to the research of the related place attachment [11,12,13]. The respondents noted their agreement with each item using a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The third part is the Satisfaction Scale, a total of 5 questions, is to understand cyclists' feelings bikeway for their comfort, health and self-growth, security, and all satisfaction. This section mainly refers to the research of the related tourists' satisfaction [14,17,21]. The respondents noted their agreement with each item using a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The fourth part is the Loyalty Scale, total of 5 questions, is mainly about the rider bikeway for their loyalty, will recommend here to other people, will say here to other people, and still come here next time riding. This part of the scale has three questions, which mainly refer to the study of the tourist loyalty to relevant tourist destinations [15,26,28]. The respondents noted their agreement with each item using a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The last part offers the demographic variables, including gender, marital status, age, education level, occupation, monthly income, occupation, and past experiences.

### 3.4 Data Analysis

In this study, collected effective questionnaires, use statistical analysis steps are as follows: 1. use SPSS For Windows 22 software, the frequency distribution and percentage of descriptive statistics, to analyze the population distribution of background variables of cyclists. 2. use Warp PLS 5 statistical software with partial least squares (PLS) to analyze the cyclist's activity involvement, place attachment, satisfaction and loyalty scale reliability and validity, as well as analyzed the four variables between the causal relationship. In the reliability test, the values of composite reliability (CR) and Cronbach's α determine reliability, the criteria for the value of CR and Cronbach's α must be equal to or greater than .70 [29,30]. Validity is based on whether the factor loading is equal to or greater than .50, in order to determine whether the latent variables have convergent validity [31]. The discriminant validity of the test is adopted in China (1998) pointed out the individual latent variable extraction of average variances extracted (AVE) to the square root of at least equal to or higher than .50 and is greater than the potential variable and other potential variables in the model [32]. Unlike the statistical analysis of LISREL for SEM, LISREL is based on the goodness of fit to determine the quality of the pattern. PLS is a normalized regression coefficient of the pattern to explain the quality of the pattern. When the standardized path coefficient is reaching statistically significant and consistent with the expected direction of the research hypothesis, the research hypothesis is supported. And the results of path coefficient and $R^2$ value between latent variables can show the degree of adaptation between structural models and empirical data. Therefore, the $R^2$ value higher, that model on explanatory power is more better [29,31,32]. According to the above description, in this study the model structure relationship analysis, depends on: (1) whether the standardized path coefficient reaches statistical significance; (2) the explanatory power of the model in $R^2$.

## 4. RESULTS

### 4.1 Respondent Characteristics Analysis

In this study, effective 451 questionnaires were collected, of which there is a total of male 272 (59.4%) and female 186 (40.6%). In terms of marital status, married is 228 (49.7%), and unmarried 213 (46.4%). In terms of age, the age of 21-30 years old 135 (29.4%) is the highest. In terms of education, the numbers of a college degree are the highest, 141 people (31.2%). On the occupation, the 98 highest in the manufacturing industry (22%). In terms of personal monthly income, the income of NT$. 20001-40000 (US$.1= NT$.30) is the highest, accounting for 168 (37.2%).

## 4.2 Analysis of Reliability and Validity of Scale

### 4.2.1 Activity involvement scale

In the reliability of the scale, composite reliability (CR) values and Cronbach s standard value must be equal to or greater than.70 [29,30], from Table 1 shows the analysis results, involvement scale of the CR and Cronbach 's alpha values are greater than.70, so the scale has high reliability. In the aspect of validity, convergent validity is in the understanding of measuring variable factor loadings on the latent variable of whether there is enough value, and factor loadings should be greater than.50 [14], if not. 50, have to delete the items, and the load factors of this study is greater than.80, with the height of the convergent validity.

### 4.2.2 Place attachment

From the results of Table 2, the reliability and validity of the place attachment scale of this study is good. First, in terms of place dependence factor, the factor loading of each item is above.70, CR is.87, Cronbach' s Alpha coefficient is .82. Second, in terms of place identity, the factor loading of each item is greater than.70, CR is .83, Cronbach' s Alpha coefficient is. 70. Third, in terms of place preference factor, the factor loading with each item is greater than.90, CR is .89, Cronbach' s Alpha coefficient is.76.

### 4.2.3 Satisfaction and loyalty

From Table 3 shows the analysis results, satisfaction scale of the CR and Cronbach 's alpha values are greater than.70, so the scale has high reliability. In the aspect of validity, the factor loading is greater than .50, with the height of the convergent validity.

From Table 4 shows the analysis results, loyalty scale of the CR and Cronbach 's alpha values are greater than .08, so the scale has high reliability. In the aspect of validity, the factor loading is greater than .50, with the height of the convergent validity.

**Table 1. Analysis of reliability and validity of involvement scale**

| Items | Factor loading | CR | Cronbach's αlpha |
|---|---|---|---|
| 1. The bike lane is very important to me. | .86* | .83 | .75 |
| 2. Riding on a bikeway is like giving your own gift. | .90* | | |
| 3. Riding on a bikeway is like doing a real self. | .84* | | |

*p<.001

**Table 2. Analysis of reliability and validity of place attachment scale**

| Latent variables | Items | Factor loading | CR | Cronbach's αlpha |
|---|---|---|---|---|
| Place dependence | 2.Compared to another bikeway, I prefer to be cycling on this way. | .78* | .87 | .82 |
| | 1. I ride in this environment and get more satisfaction than any other environment. | .78* | | |
| | 3. Cycling on this bikeway is more meaningful than cycling in another way. | .79* | | |
| | 4. Cycling in this place is the best. | .80* | | |
| | 5. I don't want to replace this bikeway with other places. | .71* | | |
| Place identity | 7. I know the environment of this bikeway very much. | .76* | .83 | .70 |
| | 8. I have a deep feeling about this bikeway. | .82* | | |
| | 6. This line is of great significance to me. | .78* | | |
| Place Preference | 9. I like to be cycling on a scenic route along the bikeway. | .90* | .89 | .76 |
| | 10. I like to be cycling in shaded places along the bikeway. | .90* | | |

*p<.001

**Table 3. Analysis of reliability and validity of satisfaction scale**

| Items | Factor loading | CR | Cronbach's αlpha |
|---|---|---|---|
| 1. Convenience and comfort. | .73* | .84 | .77 |
| 2. Leisure and safety. | .75* | | |
| 3.Health and exercise. | .71* | | |
| 4. Pursuit of self-growth. | .70* | | |
| 5. Overall satisfaction. | .71* | | |

*p<.001*

**Table 4. Analysis of reliability and validity of loyalty scale**

| Items | Factor loading | CR | Cronbach's αlpha |
|---|---|---|---|
| 1. I think myself is loyal cyclist in this bikeway. | .70* | .89 | .85 |
| 2. I will recommend this bikeway to others. | .81* | | |
| 3. I will say this bikeway good things to others. | .80* | | |
| 4. Next time I will engage bike in this way. | .82* | | |
| 5. I always suggest others cyclist cycling this bikeway. | .80* | | |

*p<.001*

#### 4.2.4 Discriminant validity analysis

In discriminant validity, as Chin (1998) pointed out the AVE of the construct should exceed other correlation coefficients of the construct [32]. Table 5 shows the matrix of correlation coefficients for all constructs in this research. Diagonal elements are the square roots of average variance extracted from the constructs. The correlation coefficients between any two constructs are smaller than the square root of the average variance extracted for the constructs. Constructs in the measurement model of this research indeed are different from one another, indicating that all constructs in this research carry sufficient discriminant validity.

### 4.3 Structure Model Analysis

This study adopts structural model detection, its structural equation model (path analysis) and results as shown in Fig. 4. In Fig. 4, the line represents the value of path coefficient of standard regression coefficient (β value), among involvement, have a positive influence on the place attachment ($\beta_{21}$=.43, p<.05), satisfaction ($\beta_{31}$=.09, p<.05), and loyalty ($\beta_{41}$=.08, p<.05). Secondly, place attachment has positive influence on the satisfaction ($\beta_{32}$=.51, p<.05) and loyalty ($\beta_{42}$=.36, p<.05). Finally, the satisfaction has positive influence on the loyalty ($\beta_{43}$=.21, p<.05).

From the relationship between the variables in Fig. 4 and Table 6, first, the explanatory power of involvement in place attachment is 19% ($R^2$=.19), and the explanatory power of place attachment to satisfaction is 30% ($R^2$=.30). Finally, involvement through the place attachment and satisfaction influenced by loyalty and the explanatory power is 30% ($R^2$=.30). In addition, from the results of Table 6, place attachment and satisfaction have a mediating role between activity involvement and loyalty.

**Table 5. Discriminant validity**

| Variables | Involvement | Place attachment | Satisfaction | Loyalty |
|---|---|---|---|---|
| Involvement | .86 | .40 | .28 | .28 |
| Place attachment | .40 | .76 | .54 | .51 |
| Satisfaction | .28 | .54 | .70 | .42 |
| Loyalty | .28 | .51 | .42 | .79 |

*Note: Square roots of average variances extracted (AVEs) shown on diagonal.*

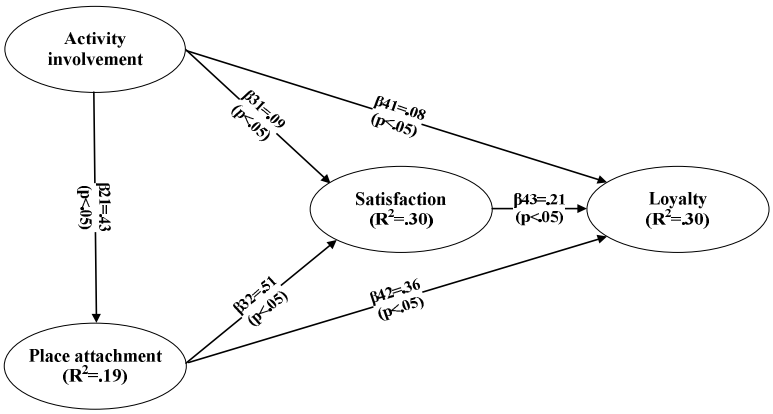


**Fig. 4. Structural model**

**Table 6. Direct effect, indirect effect, and total effect**

| Variables/Effect | | AI | PA | SA | $R^2$ |
|---|---|---|---|---|---|
| PA | direct | .43* | - | - | $R^2$=19 |
| | indirect | - | - | - | |
| | total | .43* | - | - | |
| SA | direct | .09* | - | - | $R^2$=30 |
| | indirect | .22* | - | - | |
| | total | .31* | .51* | - | |
| Lo | direct | .08* | .36* | .21* | $R^2$=30 |
| | indirect | .23* | .11* | - | |
| | total | .31* | .47* | .21* | |

*Note: AI= activity involvement, PA= place attachment, SA=satisfaction, LO=loyalty; *p<.05*

## 5. DISCUSSION, CONCLUSION AND IMPLICATION

### 5.1 Discussion

The purpose of this study is to analyze cyclist's activity involvement, place attachment and satisfaction, how to affect their loyalty for bikeway. First, analysis result found that the involvement of activities has a positive effect on place attachment. Therefore, H1 is supported, and it also supports related research. It points out that leisure activities participants are highly involved in activities, so the degree of attachment is higher [4,11,12,13]. In addition to cycling activities, it is like giving a self-gift. So, they have place identification and sense of dependence on bikeway, and create place preferences, like cycling habits of Yatasan bikeway. Therefore, from the above results, we can learn from previous studies of leisure and recreation that although participants involved in are activities different [4,5,9,11,12,13], when they are involved in activities, they will affect their attachment to places. According to the analysis, activity involvement has a positive effect on satisfaction. Therefore, support H2, and support related studies confirm that the involvement of leisure participants will affect their satisfaction with activity participation [15,16]. According to the above results, show that the bike riders cycling in Yatasan bikeway, their involvement is very high because they are satisfied there is leisure, comfort and safety, health and promote self-growth. Because they were very satisfied with the bikeway, they increased their loyalty, so H3 was also supported. And also support related studies confirm that the involvement of leisure participants will affect their loyalty [15,16]. Although this study explains the activity involvement how to influence on satisfaction and loyalty of the cyclists in the bikeway, but from the place, attachment has an indirect influence on satisfaction and loyalty, it shows that cyclists have strong emotion on the bikeway. In previous studies [5,910,11], it has been confirmed that when participants feel that their places and environment are of deep significance for them, they will have preferences for places and habitually engage in leisure activities. Because cyclists are rich in emotion for bikeway, they not only identify the place, but also express their

dependence psychology, which is the best place for them to engage in activities. So they have satisfied with this bikeway, and is used to engage in cycling, and is ready to recommend to others. Therefore, H4 and H5 of this research has been supported. And support the past research on satisfaction and place attachment result show that they have a significant positive relationship [17], and that the antecedents of satisfaction with local attachment [18,19,20,21]. Finally, this study found that satisfaction has a positive effect on loyalty. This also shows that cyclists are satisfied with bikeway, so they will have high willingness to continue cycling in this way in the future. Therefore, H6 of this research has been supported. And also supported that satisfaction will affect loyalty, when tourists perceived satisfaction were higher their revisit and recommend willingness to others will higher [22,23,24,25,26].

### 5.2 Conclusion

According to the above discussion, this study found that cyclists activity involvement is high, the degree of attachment and satisfaction relative will also promote, therefore they for bikeway loyalty is higher. In addition, this study also found that place attachment and satisfaction, between activity involvement and loyalty, has a mediating effect.

### 5.3 Implication

1) From this study, the results of the analysis, to enhance the public for the bikeway loyalty, i most important factor are to enhance the cyclists for activities involvement. So government-related sectors should take the lead engages in bicycle recreational activity by government officials and go to the bikeway on holidays. In addition, government sectors should regularly conduct activities on bikeway and combine with bicycle manufacturers and salespeople to enhance public understanding of way and encourage them to participate in cycling activities.
2) Secondly, in order to improve the cyclist's loyalty, environmental infrastructure is very important. From the result of this research, the rider on the lane is recognized, and this is the best choice in the bikeway activities. From the result of this research, the cyclists recognized this place environment, and not only prefer this bikeway, but also think to engage cycling this place is the best choice. Therefore, the government sectors should regularly maintain the bikeway facilities, set up a complaint phone, the public find the problem can be directly informed of the government to repair. In addition, to encourage people establishes volunteer teams, use free time to do clean and environmental maintenance in the way when they finish cycling.
3) For the future researcher, from the explanatory power of this model, the three variables are 30% for loyalty, so there is still a place to improve. Therefore, for future researchers, this study suggests that the number of samples can be further expanded. In addition to the need to participate in the investigation into motivation, it is also possible to increase the environmental variables. This study also thinks that there are only three questions about the activities involved and may also be the reasons for the explanation. It is suggested that future research can be added to the item.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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